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NIXON & VANDERHYE, PC
901 NORTH GLEBE ROAD, 11TH FLOOR
ARLINGTON, VA 22203

EXAMINER	
HINDENLANG, ALISON L	
ART UNIT	**PAPER NUMBER**
1791	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/584,235	SIMMELINK ET AL.	
	Examiner	Art Unit	
	ALISON HINDENLANG	1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 June 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 4, 11 and 13 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 4 recites the limitation "wherein the cone angle is from 10 to 60°". Claims 11 and 13 state "with a cone angle in the range of 10-60°". These are significantly expanded from the range of claim 1 (8 to 17°) from which claims 4, 11 and 13 depend.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kavesh (US 6448359) further in view of Chau (US 5296185)(both already of record).

5. With respect to claim 1, Kavesh teaches:

Process for making high-performance polyethylene multifilament yarn ("preparing a high tenacity, high modulus multi-filament yarn", column 1, lines 37-39) comprising the steps of

a) making a solution of ultra-high molar mass polyethylene in a solvent ("extruding a solution of polyethylene and solvent", column 1, lines 39-40);

b) spinning of the solution through a spinplate containing a plurality of spinholes into an air-gap to form fluid filaments (through a multiple orifice spinneret into a cross-flow gas stream", column 1, lines 41-42), while applying a draw ratio DRfluid ("stretching the fluid product", column 1, line 43)… and DRag at least 1 ("jet draw must be at least 5:1, and is preferably at least about 12:1", column 5, lines 9-11);

c) cooling the fluid filaments to form solvent-containing gel filaments ("quenching the fluid product in a quench bath…to form a gel product", column 1, line 46-48);

d) removing at least partly the solvent from the filaments ("removing the solvent from the gel product", column 1, line 49); and

e) drawing the filaments in at least one step before, during and/or after said solvent removing, while applying a draw ratio DRsolid ("stretching the gel product", column 1, line 48), wherein each of the spinholes has a geometry comprising a contraction zone having a gradual decrease in diameter from a diameter D0 to a diameter Dn ("the spinneret holes 28 should have a tapered entry region 30", column 4, lines 49-50)…

Kavesh does not define a DR fluid as claimed:

Of at least 50, wherein DRfluid = DRsp X DRag where DRsp is the draw ratio in the spinholes and DRag is the draw ratio in the air-gap, with DRsp greater than 1 and

However, DRsp is defined in the specification as DRsp = $(Do/Dn)^2$. Figure 2 of Kavesh clearly shows that Do – the spinneret entry hole diameter is several times the size of the spinneret capillary outlet. Given that Kavesh discloses that the DRag is

preferably least 12, DRsp need only be just over 4 (4.167) such that Do/Dn needs only be slightly greater than 2 (2.041). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a ratio of 2 or greater between spinhole inlet and outlet based on figure 2 of Kavesh.

Kavesh also does not teach a value for the cone angle of the contraction zone. In the same field of endeavor, filament spinning, Chau teaches optimizing the cone angle based on shear rate to angles below 20^{o} for the purpose of preventing line breaks. It would have been obvious to one of ordinary skill in the art at the time of the invention to try cone angles below 20^{o} as it has been held that where the general condition of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. One would have been motivated to optimize the cone angle to prevent line breaks. *See In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235.*

Further more it has been held that where the claimed range overlaps or lies inside of a prior art range a prima facie case of obviousness exists. *See In re Werthim, 541 F2d 257, 191 USPQ 90 (CCPA 1976).*

6. With respect to claim 2, Kavesh further teaches making "yarn of about 12 to about 1200 filaments" (column 1, line 66).

7. With respect to claim 3, Kavesh further teaches “the spinneret holes 28 should have a tapered entry region 30 followed by a capillary region of constant cross-section 32 in which the length/diameter (“/D) ratio is more than about 10” (column 4, lines 49-52, figure 2).

8. With respect to claim 4, the cone angle illustrated in figure 2 of Kavesh falls within the 10 to 60° range claimed.

9. With respect to claims 5 and 6, figure 2 of Kavesh shows the spinhole inlet diameter to be several times greater than the outlet diameter. It would have been obvious to one of ordinary skill in the art at the time of the invention to use a spinneret with a draw ratio in the spinholes of at least 5 or 10 based on figure 2 of Kavesh.

10. With respect to claims 7 and 8, Kavesh teaches "the spinneret holes 28 should have a tapered entry region 30 followed by a capillary region of constant cross-section 32 in which the length/diameter (L/D) ratio is more than about 10:1" (column 4, lines 49-52, figure 2).

11. With respect to claims 9 and 10, Chau further teaches spinholes that have constant diameter inlet zones (column 5, lines 31-32, figure 1) but does not specify the geometry of the inlet zone.

It would have been obvious to one having ordinary skill in the art at the time of the invention to choose such a ratio since Chau discloses a spinhole with an inlet zone and teaches that "the size and geometry of the hole are preferably selected to maximize the stability of the dope flow through the hole" (column 6, lines 3-5) and it has been held that where the general condition of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. One would have been motivated to modify the spinhole geometry as claimed for the purpose of maximizing the stability of the product. *See In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235.*

12. With respect to claim 11, Kavesh as applied to claim 1 teaches:

the spinplate comprises at least 10 … spinholes ("a 16-hole spinneret", column 6, line 7)… a downstream zone of constant diameter Dn and a length Ln, with a length/diameter ration Ln/Dn of at most 15, and a contraction zone between the inflow and downstream zones having a gradual decrease in diameter from the diameter Do to the diameter Dn ("the spinneret holes 28 should have a tapered entry region 30 followed by a capillary region of constant cross-section 32 in which the length/diameter (L/D) ratio is more than about 10:1", column 4, lines 49-52, figure 2)

Chau, as applied to claim 1, teaches optimizing the cone angle based on shear rate to angles below 20^{o} for the purpose of preventing line breaks.

Chau further teaches spinholes that have constant diameter inlet zones (column 5, lines 31-32, figure 1) but does not specify the geometry of the inlet zone.

It would have been obvious to one having ordinary skill in the art at the time of the invention to choose such a ratio since Chau discloses a spinhole with an inlet zone and teaches that "the size and geometry of the hole are preferably selected to maximize the stability of the dope flow through the hole" (column 6, lines 3-5) and it has been held that where the general condition of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. One would have been motivated to modify the spinhole geometry as claimed for the purpose of maximizing the stability of the product. *See In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235*.

13. With respect to claim 12, as discussed in claim 1, Kavesh teaches DRag's of at least 5, preferably at least 12 and obviates DRsp's of at least 4 for a DRfluid of 50. In the examples Kavesh further discloses using jet draw ratios of 22.7 and 33.8 (column 6, lines 51-56, Table 1). Thus it would have been obvious to one of ordinary skill in the art

at the time of the invention to apply a DRfluid of at least 100 to the method taught by Kavesh.

14. With respect to claim 13, Kavesh teaches:

Spinning a 3-15 mass% solution ("12 wt% linear polyethylene", column 5, line 55) of linear UHPE of IV 15-25 dl/g ("the linear poluethylene was himont UHMW 1900 having an intrinsic viscosity of 18 dl/g", column 6, lines 1-2) through a spinplate containing at least 10 spinholes ("feed the polymer solution …to a 16-hole spinneret", column 6, line 6-7) into an air-gap ("passed through a spin gap", column 6, lines 11-12), the spinholes comprising a contraction zone with a cone angle in the range 10-60° (the spinneret holes 28 should have a tapered entry region 30", column 4, lines 49-50, figure 2) and comprising a zone downstream of the contract zone having a constant diameter Dn and a length Ln("followed by a capillary region of constant cross-section 32", column 4, lines 50-51) … while applying a fluid draw ratio DRfluid = DRsp X DRag of at least 100 (obvious - see the rejection of claim 12) and a draw ratio DRsolid of between 10 and 30 (see "solid state stretch" Table 1).

Kavesh does not teach that the constant diameter zone has an Ln/Dn smaller than 10.

In the same field of endeavor, spinning polymer fibers, Chau teaches that "the length of the capillary is preferably no more than about 10 times the diameter of the capillary" (column 5, lines 51-53) for the purpose of stabilizing the filaments based on the material being drawn and draw conditions, though Chau also teaches that "the length of the capillary section is not critical" (column 5, lines 45-46). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the spinholes used in the method taught by Kavesh by keeping the Ln/Dn ratio below 10 for the purpose of stabilizing the filaments.

15. With respect to claim 14, Kavesh teaches:

Spinplate comprising at least 10 spinholes ("a 16-hole spinneret", column 6, line 7), wherein each spinhole has a geometry comprising … a downstream zone of constant diameter of at least Dn and a length Ln and a length/diameter ratio Ln/Dn of from 0 to 25, and a contraction zone between the inflow and downstream zones having a gradual decrease in diameter from the diameter Do of the inflow zone to the diameter Dn of the downstream zone ("the spinneret

holes 28 should have a tapered entry region 30 followed by a capillary region of constant cross-section 32 in which the length/diameter (L/D) ratio is more than about 10:1", column 4, lines 49-52, figure 2) and a cone angle in the range 8-75° (see figure 2).

16. Kavesh does not teach spinholes with a constant diameter inflow zone.

17. In the same field of invention, filament spinning, Chau teaches spinholes that have constant diameter inlet zones upstream of transitional cone and capillary zones (column 5, lines 31-40, figure 1) for the purpose of effectively transitioning to the capillary section. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the spinholes taught by Kavesh by adding an inlet zone as taught by Chau for the purpose of effectively transitioning to the capillary section.

The combination does not specify the geometry of the inlet zone.

It would have been obvious to one having ordinary skill in the art at the time of the invention to choose such a ratio since Chau discloses a spinhole with an inlet zone and teaches that "the size and geometry of the hole are preferably selected to maximize the stability of the dope flow through the hole" (column 6, lines 3-5) and it has been held that where the general condition of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. One would have been motivated to modify the spinhole geometry as claimed for the purpose of maximizing the stability of the product. *See In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235*.

18. With respect to claim 15, Kavesh further teaches "multifilament yarn of about 12 to about 1200 filaments" (column 1, line 66).

Response to Arguments

19. Applicant's arguments filed 06/23/2009 have been fully considered but they are not persuasive.

20. Applicant argues that Kavesh does not teach controlling the draw ratio in the spinholes. Examiner considers this to be unpersuasive because claim 1 only requires the draw ratio in the spinhole to be greater than 1. The instant specification defines DRsp as DRsp = $(Do/Dn)^2$ where Do is inlet diameter and Dn is the capillary outlet diameter. While Kavesh does not calculate a draw ratio in the spin holes or give specific dimensions for the spinhole inlet it does teach spinholes with geometry which would give the claimed draw ratio. Figure 2 of Kavesh shows that the inlet diameter of each spinhole is significantly larger than the exit diameters which will give a draw ratio in the spinhole greater than 1.

21. Applicant argues that one of ordinary skill in the art would not understand the “tapered entry region 30” (column 4, lines 49-50, figure 2) of Kavesh to be equivalent to the “contraction zone having a gradual decrease in diameter from a diameter Do to a diameter Dn" (instant claim 1). Examiner finds this argument to be unpersuasive because Figure 2 of Kavesh clearly shows a spinhole section which has a diameter that gradually decreases from the upstream end to the downstream end. “Contraction zone” as defined in independent claim 1 does not require the presence of a separate entry/inflow zone upstream.

22. Applicant argues that Kavesh is silent regarding the fluid draw ratio being at least 50. Examiner finds this argument to be unpersuasive because as explained in the

rejection of claim 1 the geometry and conditions taught by Kavesh would obviate a fluid draw ratio as defined in the instant specification of at least 50. Kavesh discloses that the DRag is preferably least 12. Therefore DRsp need only be just over 4 (4.167) (Do/Dn of 2.041) for the fluid draw ratio to be at least 50. It would have been obvious to one of ordinary skill in the art at the time of the invention to use a ratio of 2 or greater between spinhole inlet and outlet based on figure 2 of Kavesh.

23. Applicant argues that the process of Chau uses a different material, does not disclose the fluid draw ratio claimed, and does not disclose the geometry claimed. Examiner finds this argument to be unpersuasive because as explained above Kavesh teaches the fluid draw ratio claimed. Further more Chau is used as a secondary reference to teach that variations of spinhole geometry are known in which the spinhole has an inflow zone and that it is known to choose the geometry of the spinhole to suit the process conditions and enhance process stability (column 1, lines 31-68).

24. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Conclusion

25. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALISON HINDENLANG whose telephone number is (571) 270-7001. The examiner can normally be reached on Monday to Thursday 7:30 - 5 pm; Every other Friday 7:30 - 4 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Philip Tucker can be reached on 571-272-1095. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ALH

/Philip C Tucker/
Supervisory Patent Examiner, Art Unit 1791